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The Relationship between the WISC-IV GAI and the KABC-II

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The Relationship between the WISC-IV GAI and the KABC-II

Thesis submitted to
the Graduate College of
Marshall University

In partial fulfillment of the
requirements of the degree of
Education Specialist
in School Psychology

By

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Abstract

This present study compared the WISC-IV GAI and the global scores of KABC-II. The tests were administered to referred students in rural schools in Ohio and West Virginia. The study included 30 Caucasian students between the ages of 6 years, 7 months to 16 years, 11 months; 19 females and 11 males with an average age of 9 years, 10 months. Results found a strong correlation between the GAI and the FCI; and the GAI and the MPI. The results of the t-test of significance suggested that these tests given to the same student would yield similar results.

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The Relationship between the WISC-IV GAI and the KABC-II

Chapter One

Literature Review

Psychologists must strive to ensure psychoeducational evaluations are multifaceted, comprehensive, fair, valid, and useful (Jacob & Hartshorne, 2007). When decisions are being made about the best way to educate students, the information gained from the psychological assessments assist School Psychologists to describe, label, and categorize children (Sattler & Hoge, 2006). As part of a complete and well rounded evaluation, the cognitive assessment has been an integral component when making decisions about placing children within special education. Therefore, knowing how each cognitive assessment measures an examinee's general intelligence allows the psychologist to make informed decisions regarding the interpretation of the test and the placement of the student. These cognitive tests can produce scores that vary for several reasons. Different intelligence tests sample different combinations of abilities, thus an individual's IQ is likely to vary from one test to another, depending on what the tests measure and on the individual's background (Sattler, 2006).

Periodically, in order to remain relevant, developers of intellectual assessments revisit the underlying theory, design, and normative data inherent in an instrument. Each time a revision is completed the instrument is renormed with a new sample population. The developers then determine the concurrent validity by comparing the revision with other scientifically validated related assessments. Understanding the validity of assessment instruments is a key part of evaluating the usefulness and

appropriateness of any assessment measure (Merrell, Ervin, & Gimpel, 2006; Wechsler, 2003).

In addressing the validity of an instrument, it is imperative for the publishing company of the instrument to research and publish the validity information, and it is additionally important for other professionals to conduct studies that confirm or challenge the published data. In the case of the WISC-IV, Wechsler's validation studies were conducted using evidence based on response processes and internal structure (Wechsler, 2003). It is of note that their relative validity comparisons were limited to those tests published by The Psychological Corporation, the parent company of the Wechsler Intelligence Scales for Children (WISC-IV) (Wechsler, 2003).

On the other hand, the validity of Kaufman Assessment Battery for Children, Second Edition (KABC-II) is supported by correlations with the WISC-IV, Wechsler Preschool and Primary Scale of Intelligence (WPPSI), Kaufman Adolescence and Adult Intelligence Test (KAIT) and the Woodcock-Johnson III (WJ III) (Kaufman & Kaufman, 2004). According to the Kaufman Technical Manual (Kaufman & Kaufman, 2004), validity is supported by correlations between the KABC-II and the WISC-IV FSIQ using two different populations. The first study found a correlation of .71 for the Mental Processing Index (MPI) and .77 for the Fluid-Crystallized Index (FCI). The second study resulted in a correlation of .88 for the MPI and .89 for the FCI.

Originally introduced as an adjunct to the WISC-III, the General Ability Index (GAI) was added to the examiner's options when describing the best explanation of examinee's broad intellectual functioning (Raiford, Weiss, Rolfhus, Coalson, 2005). Prifitera, Weiss, and Saklofske (1998) wrote that this flexibility was needed because a

clinically and statistically significant low score in processing and memory could adversely affect the general intelligence score.

For the purposes of this study, the WISC-IV GAI will be compared to the KABC-II FCI and the MPI. Previous studies have shown the WISC-IV GAI, as a short form, is a strong predictor of the FSIQ (Weiss, Saklofske, Prifitera, Chen, & Hildebrand 1999; Scott, 2006), and the FSIQ was found to be “basically interchangeable” with the KABC-II (Kaufman & Kaufman, 2004; McKown, 2010)

Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV)

The WISC-IV assesses the cognitive processing and reasoning abilities of children (Wechsler, 2003). The results can be used as one part of a comprehensive evaluation in which giftedness, mental impairment, and personal strengths and weaknesses can be identified (Wechsler, 2003). In addition, the test authors indicated that the WISC-IV could be used for treatment and placement decisions, both clinically and educationally, and that the test adds valuable clinical information for neurological evaluations and research purposes.

The WISC-IV provides a global score or Full Scale Intelligence Quotient (FSIQ) as well as composite scores in four cognitive domains: Verbal Comprehension Index (VCI), composed of Similarities, Vocabulary, Comprehension, and two supplemental subsets (Information and Word Reasoning); Perceptual Reasoning Index (PRI), composed of Block Design, Picture Completion, Matrix Reasoning, and one supplemental subtest (Picture Completion); Working Memory Index (WMI), composed of Digit Span, Letter-Number Sequencing, and one supplemental subtest

(Arithmetic); Processing Speed Index (PSI), composed of Coding, Symbol Search, and one supplemental subtest (Cancellation). Within the WISC-IV subtest analysis, when there is a significant difference between the VCI/PRI and the WMI and/or PSI, the psychologist is given the flexibility to use the GAI which is derived from the VCI and PRI. The GAI, then, is not influenced by lower memory and processing skills such as those often seen in children with learning disorders and Attention-Deficit/Hyperactivity Disorder (Raiford et al., 2005).

Kaufmann Assessment Battery for Children-Second Edition (KABC-II)

The Kaufman Assessment Battery for Children Kaufman-Second Edition (KABC-II) is an individually administered evaluation of general intelligence of children and adolescents and is based on a dual theoretical model (Kaufman & Kaufman, 2004). The KABC-II, developed in 2004, was based on the data-driven Cattell-Horn-Carroll (CHC) and clinically-driven Luria theoretical models. The four scales, common to both, have a CHC and a Luria name with each providing a separate global score.

The CHC model is a research-based psychometric theory, that categorizes special cognitive abilities. There are three basic levels that span a range of abilities from general to broad to narrow. The CHC model provides a global score called the Fluid-Crystallized Index (FCI) and the Mental Processing Index (MPI).

The Luria neuropsychological model is composed of three functioning systems that represent the brain's basic functions. These include: Block 1, which is responsible for arousal and attention; Block 2, which uses a person's senses to analyze, code, and store information; and Block 3, which applies executive

functioning for formulating plans and programming behavior. The Luria global ability score is called the Mental Processing Index (MPI) (Kaufman & Kaufman, 2004).

The major difference between the FCI and the MPI is that the Knowledge Broad Ability is a supplementary test and not included when calculating the MPI (Kaufman, Lichtenberger, Fletcher-Janzen, and Kaufman, 2005; Kaufman & Kaufman, 2004). Hunt (2005) concluded that the majority of KABC-II subtests are good to excellent measures of the knowledge, long-term and short-term memory, and visual processing, as intended by the authors.

Concurrent validity

Because the WISC-IV research supported using other Wechsler assessments, there is a dearth of information emanating from the parent company comparing it to other respected instruments. The KABC-II, on the other hand, has compiled and published comparison data in its manual. The results of these studies found:

The mean of the KABC-II was 97.3, about two points higher than the mean WISC-IV Full Scale IQ. The correlations of the WISC-IV FSIQ with both the KABC-II FCI and MPI were high and are nearly equal (.89 and .88, respectively) providing strong support for the concurrent validity of the two KABC-II global scale indexes (Kaufman & Kaufman, 2004, p. 111-112).

Previous Research

Scant research has been conducted with these two instruments; however, the two following studies have added to the body of knowledge. Each narrow in scope, together they add valuable information to the concurrent research for both.

An investigation was conducted studying the correlation between the WISC-IV FSIQ and the GAI. A small sample of students from public schools was assessed using the WISC-IV. Each assessment was then scored and the two scores were compared. The study found the FSIQ and the GAI were essentially the same score (Scott, 2006).

A second study was conducted comparing the WISC-IV FSIQ to the KABC II FCI and MPI. Again, a small sample of public school students was assessed using the WISC-IV and the KABC-II. Each pair of assessments was scored with the FSIQ compared to the FCI and the MPI. The study found no significant differences between the WISC-IV FSIQ and the KABC-II FCI and/or the MPI (McKown, 2010).

Purpose of the Study

The purpose of this study is to examine the correlation of the WISC-IV GAI with the KABC-II FCI/ MPI and to see if the two tests yield similar scores if administered to the same student. This study is needed due to the lack of research on the correlation between the WISC-IV GAI and the KABC-II FCI and the WISC-IV GAI and the KABC-II MCI. Searches of journals, texts, and the internet were conducted and little information was found concerning this topic.

Research Questions

1. What is the correlation between the WISC-IV GAI and the KABC-II FCI?
2. What is the correlation between the WISC-IV GAI and the KABC-II MPI?
3. Will the WISC-IV GAI and the KABC-II FCI yield comparable scores when administered to the same student (t-test)?

4. Will the WISC-IV GAI and the KABC-II MPI yield comparable scores when administered to the same student (t-test)?

Chapter Two

Methods

Subjects

The WISC-IV and the KABC-II were administered to students referred for a psychoeducational evaluation to determine if the students qualified for special education or gifted services during the 2009-2010 school year. The WISC-IV and the KABC-II were administered in counterbalanced order. Subjects were 30 Caucasian students, 19 females and 11 males, who attended schools in rural school districts in Ohio and West Virginia. The students were in grades ranging from 1st thru 9th with the average being 3rd grade.

The sample was made up of students who were either not making adequate progress academically or those performing at a rate much higher than their peers. All students were referred by their teacher, parent, or a multidisciplinary meeting. This meeting is called the Student Assistance Team in West Virginia. However, in Ohio, the meeting is called the Pupil Services Team or the Intervention Assistance Team.

Instruments

WISC-IV. Published in 2003, the normative data were collected from 2,200 students aged 6:0-16:11. This sample was divided into 11 age groups that contained 200 students each. The sample was equally represented between boys and girls. This population of students was gathered so that they had the same representation as the population of the United States reported in the 2002 Census data. The areas of representational interest were age 6-16, race, sex, parent educational level, and

geographic area (Wechsler, 2003). The WISC-IV has been adapted and standardized in Canada, the United Kingdom, France, Australia, and Germany (Flanagan & Kaufman, 2009).

KABC-II. Published in 2004, the normative data were collected from 3,025 students aged 3-18 chosen to match the 2001 U.S. Census data. Variables included age, gender, geographic region, ethnicity and parental education. The ensuing 18 groups were composed of 100-200 children and equally split between boys and girls (Kaufman & Kaufman, 2004). In addition to the WISC-IV, the KABC-II was strongly correlated to the Wechsler Preschool and Primary Scale of Intelligence —Third Edition (FSIQ), Kaufman Adolescent and Adult Intelligent test (Composite), and the Woodcock-Johnson III—Tests of Cognitive Abilities (GIA) (Kaufman & Kaufman, 2004).

Procedures

An informed consent for testing was obtained, and the children were assessed by one of two Licensed School Psychologists or one of the two School Psychology Interns as part of a multidisciplinary evaluation. The two cognitive assessments were administered in counterbalanced order by the examiners.

Chapter Three

Results

A Pearson Correlation was computed to compare the General Ability Index of the WISC-IV with the Fluid-Crystallized Index and the Mental Processing Index of the KABC-II. The relationship between the GAI and the FCI was found to be $r = .86$, $n = 30$, $p < .05$; a correlation that is considered to be “very strong.” The GAI was also found to be highly correlated with the MPI ($r = .80$, $n = 30$, $p < .05$).

The t-test comparing the GAI and the KABC-II FCI did not reach significance as $t(29) = .12$, $p > .05$; see table 2. Additionally, the t-test comparing the GAI and the MPI did not reach significance as $t(29) = .07$, $p > .05$; see table 2.

Chapter Four

Discussion

The purpose of this study was to examine the correlation of the WISC-IV General Ability Index to the KABC-II. Using a sample size of 30 students, results of this study show a strong positive correlation between the global scores of the KABC-II and the WISC-IV GAI. In addition, the t-test revealed that the mean scores for the WISC-IV GAI and KABC-II assessments did not show a significant difference. This study is consistent with research suggesting the WISC-IV FSIQ and the KABC-II are highly correlated (Kaufman & Kaufman, 2004; McKown, 2010). Research also shows the WISC-IV FSIQ is highly correlated to the GAI (Prifitera et al., 2005; Scott, 2006).

The McKown study in the literature review suggests there is no significant difference between the WISC-IV FSIQ and the KABC-II (FCI and MPI). This study showed a higher correlation with both the FCI and the MPI when compared to the FSIQ instead of the GAI. The t-tests were higher for the comparison of the GAI/FCI and comparable for the comparison of the GAI/MPI and the FCI/MPI. It is important to note that the correlations were both high, but do not measure the same things. The KABC-II FCI and the MPI encompass various components that make up “g” including short-term working memory. The WISC-IV GAI omits the short-term working memory and the processing speed in its calculation of “g” believing that a lower working memory and processing speed artificially lower the IQ score. Furthermore, the KABC-II FCI and the WISC-IV GAI have a knowledge component that is omitted

in the MPI. It is important to note, when making placement decisions, that the GAI alone can indicate the need for further testing but should not be used for any decisions about labeling or educational services for a student (Sattler, 2004).

Future research of the relationship should include a larger sample size, greater cultural diversity, greater geographic representation, and any other unknown variables, thereby increasing the generalizability of the study.

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Table 1 Pearson Product Movement Correlations

	N	Correlation	Sig.
General Ability Index & Fluid-Crystallized Index	30	.86	.000
General Ability Index & Mental Processing Index	30	.80	.000

Table 2 Means, Standard Deviations, t-test for GAI/FCI and GAI/MPI

		Mean	N	Std. Deviation	t-test
Pair 1	General Ability Index	91.8	30	18.0	$t = .12, p > .05^1$
	Fluid-Crystallized Index	89.1	30	17.6	
Pair 2	General Ability Index	91.8	30	18.0	$t = .07, p > .05^2$
	Mental Processing Index	88.1	30	16.8	

¹t-test comparing WISC-IV GAI and KABC-II FCI

²t-test comparing WISC-IV GAI and KABC-II MPI